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It's not the economy, stupid! External effects on the supply and demand of cinema entertainment

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Abstract The paper addresses whether the state of the economy impacts the supply of and demand for cinema entertainment. A literature review on the drivers of cinema supply and demand is provided, and two competing hypotheses are extracted. Economic downturns could either lead to a sober mood and drive the interest in serious genres or drive the need for distraction leading to an increased interest in feel-good or action movies. However, characteristics of the movie industry suggest that economic key factors have only limited effects on supply and demand. A time series analysis of supply and demand in three major European markets indicate that demand is unrelated to the state of the economy. In aggregate, the demand does not instruct supply. Fluctuations in individual movie quality superpose potential effects of the economic context on the aggregated demand. Simultaneously, a focus on film as art superposes potential effects of the economic context on the supply.

Keywords Movie industry · Cinema demand · Genre · Consumer confidence · Economic growth · Historic events

JEL Classification L82 · C23

1 Introduction

Every time the economy dips, trade papers and the general interest press start to speculate about the effects on the entertainment and movie industry. Commentators

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in the business section usually seem to be optimistic pointing to an increased need for distraction in times of hardship, whereas commentators from the culture section seem to be pessimistic, especially concerning funding for highbrow entertainment. To our knowledge, neither side has presented sound data to support its reasoning; both rely completely on anecdotal evidence. Turning to the academic literature is not satisfactory either, since the rather few studies provide no clear answer but raise the question whether the state of the economy is an important influencing factor at all. Therefore, we believe that this is a relevant research topic and that a sound study can contribute to academic and practical knowledge. A better understanding of the influence of economic growth on the size and nature of the demand for cinema entertainment can ultimately lead to a better allocation of production resources.

The paper is structured as follows. First, we will provide a literature review on existing studies that address the factors influencing supply of cinema entertainment and cinema attendance and the potential effects of economic growth on media financing and demand. The literature review suggests mixed and limited effects. We derive three research questions: (1) How does economic growth influence the overall demand for cinema entertainment? (2) How does it shift the respective market shares of different genres? And (3) do other external factors besides the state of the economy have more explanatory power concerning supply and demand? We then present the data and measures used to address these questions. Results from time series analysis using a vector autoregression (VAR) model will be reported. Special emphasis will be given to differences in supply and demand. The paper ends with a discussion and concludes that economic growth is a less important driver of cinema supply and demand.

2 Literature review

2.1 Supply

There are fairly little research results on what influences the supply of entertainment media. One indicator of the supply in media content is the analysis of the effect of economic growth and recessions on the financing and production of different media. Changes in the advertising revenues and thus the financial basis of most mass media have been attributed to GDP changes (Picard 2001; van der Wurff et al. 2008). The results suggest an unambiguous effect moderated by country characteristics and the media technology in question. Newspaper advertising corresponds relatively closely to economic change, whereas TV and radio correspond relatively weakly to advertising reduction in times of recession. Newspaper revenues in general have also been related to GDP, only to demonstrate the long-term decline of a mature industry and not to model short-term effects of recessions (Compaine and Gomery 2000: 2). However, in contrast to newspapers and television, cinema entertainment is not funded indirectly through advertising, but directly by the audience. An expanding or contracting economy might have an effect on the volume and cost of production capital available, but such effects tend to be absorbed by adjusted schedules in long production cycles. Concerning the supply understood as those

movies released rather than movie projects started, we can expect that distributors reacted on their expectation of consumer demand. Bakker (2003) describes that from 1914 to 1964, US producers changed the content of their films according to changes in consumer sentiment: "During the Depression, films portraying big business and wealth positively gave way to films criticizing big business and being slightly more inclusive towards women and minorities. Despite their reliance on Wall Street capital and a draconian Production Code, the studios had to adapt their films to consumer preferences or go under" (Bakker 2003: 105). That said, it must be amended that "consumer preferences" in this case is a synonym for public opinion rather than an economic indicator such as the consumer confidence index (CCI) introduced in 1967.

Caves identified a self-centered attitude of producers of creative content—what he calls the art for art's sake property of creative production (Caves 2000). Several studies show that this artistic or creative orientation is evident not only among producers, but also among distributors in the television business (Hesmondhalgh and Baker 2008; von Rimscha and Siegert 2011). While some distributors are oriented only toward profit maximization, others—especially in the art-house or public service sector—seem to have a sense of a mission and an orientation toward society. They publish media content that is not necessarily in high demand but nevertheless considered as worthy and important for the self-reflection and cohesion of society. This also corresponds with the traditional reluctance of many movie industry executives to rely on market research data (Handel 1953) rather than relying on intuition and personal taste (von Rimscha 2012).

Existing studies suggest that historical events may alter genres. Silverblatt (2007: 66), for instance, argues that the terror attacks on the World Trade Center in New York in 2001 would have changed the crime genre in the US, leading to a darker and more uncertain perspective on a world in which it would be difficult to trust anyone. In general McIntosh, Schwegler, and Terry-Murray (2000) found that between 1960 and 1990 in times of "threat", the highest-rated US television shows were more meaningful and confronted more serious issues. Threat was broadly defined as increases in unemployment, consumer price index (CPI), prime interest rate, bombings, crime, work stoppages, suicide, homicide, and divorce. Comparably, the lyrics of chart hits in the US between 1955 and 2003 were found to be more meaningful, comforting, and romantic in times of threatening social and economic conditions (Pettijohn and Sacco 2009). The authors explain this with what they call the environmental security hypothesis (ESH) (Pettijohn and Tesser 1999), whereby threatening and uncertain circumstances would lead individuals to prefer mature and serious alternatives. Reciprocal, we can assume that the environmental situation has first affected the producers and distributors to offer this kind of content. Pettijohn (2003) has also tested his ESH in relation to movie genres. The results did not support the hypothesis, indicating an increased demand for comedies rather than dramas in hard times; however, he only analyzed the top five films in the USA per year.

Overall, we find little support in the literature for a strong influence of the state of the economy on the supply of movies—overall as well as in terms of preferred genres.

2.2 Demand

To date, there is only one study publicly available that analyzes GDP as a predictor for cinema demand. In her regression analysis, explaining the influences on the long-term decline of cinema admission, Pautz (2002) found no influence of GDP. However, she did not account for possible lagged or curvilinear effects. In the latest recession, several newspaper articles referred to the fact that after the Wall Street crash of 1929, cinema admission surged. It might be wise to disregard this as a guideline for today's business. The introduction of sound spurred demand, and television as a cheap substitute to cinema was not yet available. Thus, the motion picture industry should not be regarded as recession-proof per se. Urquhart (1981) shows that at least during the 1973–1975 recession, American motion pictures were clearly in decline. Vogel (2007: 74) suggests that in a recession leisure spending preferences shift toward lower-cost, closer-to-home entertainment activities. Ticket sales would remain steady or even rise during the early stages of a recession only to falter near the recession's end.

Using different variations of time series analysis, several studies model historic cinema demand in different countries. Belson (1958), Cameron (1986), and MacMillan and Smith (2001) all identify the proliferation of television as the most important driver of cinema attendance in Britain. However, the effect of the video recorder as the next innovation in audio–visual home entertainment is less agreed upon. Some authors state that it has lured the audience away from the cinema (Cameron, 1988), and others think it has just expanded the market (Wood and O'Hare 1991).

Cameron (1990) finds a strong income elasticity of demand for cinema tickets. Likewise, MacMillan and Smith (2001) suggest that cinema consumption is a normal commodity where consumption proportionally increases with more disposable income. We know of no studies that suggest cinema attendance would be a necessity good (demand rises with income, but share of budgets shrinks) or a luxury good (demand rises disproportionately with income, increasing the share of budget spending). Dewenter and Westermann (2005) show that for the German market, income elasticities are significantly reduced when more influences on cinema attendance are accounted for. However, they show strong and consistent price elasticity. Similar results are presented by Blanco and Pino (1997) for the Spanish market. They find that cinema demand is elastic with regard to price and income; however, the coefficient value is much higher for price. Collins and Hand (2005) analyzed movie going behavior on an individual level and found that the probability of going to the movies is higher in well-off socioeconomic groups. One could thus expect that a societal shift toward higher ranging socioeconomic groups might drive aggregated demand. Beyond income and price elasticity, cinema attendance has also been explained using a rational addiction framework (Sisto and Zanola 2010), and Hand (2002) uses an ARIMA model to forecast cinema admission in Britain. He uses only historic admission data and neglects any possible influence of price dynamics and economic growth.

Economic growth has an impact on the demand for media content. Consumer confidence, which is closely related to the economic outlook, not only influences the willingness to buy durable goods (Throop 1992) but also influences how prepared

people are to spend on service expenditures such as travel and leisure. Malgarini and Margani (2007) show that consumer confidence can partly explain consumption patterns even after controlling for disposable income and GDP. This is especially true for service expenditures.

More recently, the impact of the relationship among consumer confidence, the economy, and the news media has been studied. Usually, this impact is modeled as news media affecting consumer or voter sentiment (Goidel and Langley 1995; Tims et al. 1989); however, Hagen (2005) showed the state of the economy, media coverage, and the consumer sentiment to be interdependent. Zullow (1991) used entertainment media content, that is, the pessimism in lyrics of US chart hits, as a predictor for consumer optimism and an indirect predictor for GNP growth. However, a potential effect of consumer confidence on the consumption and content of entertainment media has not been studied.

In the context of the environmental security hypotheses mentioned earlier, the influence of different kinds of threats on the viewing behavior was compared (Gowgiel and McIntosh 2010). The authors found that the perceived physical threat in the aftermath of the World Trade Center attacks in New York did alter the TV audience's viewing behavior toward more serious and violent fare. Contrarily, the economic threat represented in the 2008 recession did not alter the viewing habits. Likewise, Webster (2008) has found that the ESH can only be supported for existential threats, not for economic downturns.

Although the studies reported so far suggest some influence, there are some limitations due to the good characteristics of movies. Movies are horizontally differentiated, or as Caves puts it there is "infinite variety" (Caves 2000). In such a situation, consumers might become indifferent which movie to choose among a selection of similar options. Positive information feedback, such as earlier audience figures (Walls 1997; Hand 2001) or word of mouth (Moul 2007; McKenzie 2009), leads to a concentration of demand on few successful movies. Walls refers to a winner-take-all property. However, given that the movie market includes commercial movies as well as art-house movies, there is buyer heterogeneity, and "niche products often retain pockets of loyal users" (Schmalensee 2000)—the long tail in a winner-take-*most* market. Apart from the attractiveness evolved in a network of potential viewers, the actual quality of the movies also fluctuates though it is hard to measure on a reliable and uniform scale (Ginsburgh and Weyers 1999).

To sum up, existing results suggest a connection between the state of the economy and cinema demand; however, this theory has not been thoroughly tested. In terms of content, we can conclude that existing studies suggest that the audience's demand for different types of content is influenced by environmental conditions; however, the influence of economic variables is disputed. The perspective of movies cheering up or distracting, which is popular in the general press, is evident in one study but not otherwise addressed in the academic literature. In terms of movie traits, we can conclude that quality variations and network effects among members of the audience might have a strong dynamic effect on movie demand masking other potential factors. A hugely popular box office hit like Avatar (Cameron 2009) might draw people to the cinemas even if the economic setting during the financial crisis might suggest declining demand or a greater interest in another genre (Fig. 1).

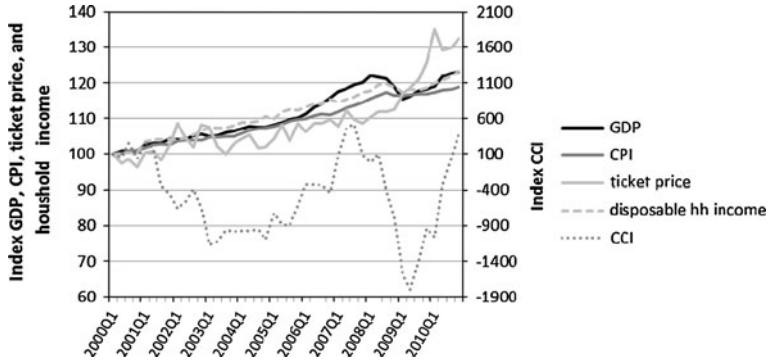

Fig. 1 Development of economic indicators in Germany (Indexed: 2000Q1 = 100)

3 Research questions

Recent studies of cinema attendance have been undertaken on an extremely aggregated level generally neglecting the content. Demand is described by price-elastic or substitute leisure activities. Changes in demand for certain types of movies have been attributed to changes in consumer tastes (Peterson and Anand 2004: 317–8). Supply is described mainly from the perspective of film studies. Changes in supply are attributed to creative trends (e.g., Langford 2005).[1] In contrast, our research question is focused on the explanatory power—or weakness—of economic growth.

> To what extent can the state of the economy explain supply of and demand for cinema entertainment?
>
> Does the state of the economy influence the genre mix of the supply and the demand?

One suggestion would be that consumer confidence as a result of economic growth influences the taste of the audience. Here, we find two competing hypotheses. Either the audience longs for distraction, which would drive demand for feel-good movies like comedies and kinetic eye-candy like fantasy movies, or they are in a sober mood ready to consume serious fare such as drama and documentaries, as suggested by the ESH. To cater for fluctuations in the quality of the movies on offer we also include a quality measure as control variable. This leads to our last research question where we want to clarify whether there actually is a direct connection between supply and demand. Thus, we ask:

Do other external influences besides the state of the economy have equal or maybe higher explanatory power concerning supply of and demand for cinema entertainment?

[1] Wyatt (1994) is an exception here. However, his description of the emergence of the "high concept" movie is about making a movie a marketable package independent of the genre.

4 Method

The objective of this study is threefold. First, we analyze whether there is a general impact of GDP, consumer confidence, the development of consumer prices, disposable household income, or ticket price on the movie industry. By analyzing the number of movies released (supply) as well as the box office revenue (demand), we can distinguish between the reaction of the industry and that of the audience. In the second step, we capture possible shifts in the market shares of different genres by analyzing genre-specific supply and demand. Judging from the literature, we expect limited and delayed effects of changes in economic indicators on supply and demand for cinema entertainment. The time lag is likely to differ for the variables. Consumer confidence and demand may change synchronously while it would take some time for distributors to adjust supply to a changed GDP.[2] In the third step, we analyze whether there is actually a reciprocal relation between supply and demand and introduce historic event as alternative explanation. We use a vector autoregressive (VAR) model to capture the linear interdependencies among the time series of the state of the economy and the supply and demand for cinema entertainment. VAR modeling allows to incorporate autoregression (the extent to what a variable can be explained with its own past values) and the effect of other variables and their lagged values.

It is reasonable to suspect country characteristics to moderate relations between economic indices and cinema entertainment. For example, the volatility of the economy might have an influence: Strong booms or recessions might have stronger effects than smaller ones. Different national characters (Terracciano et al. 2005) might also regulate how people react toward the challenge of a downturn. Country stereotypes suggest a broad range from drowning sorrows in alcohol to laughing them away. Thus, we will compare the effects in three countries with different backgrounds. We use three European countries representing the three types of media systems suggested by Hallin and Mancini (2004): Germany for the democratic corporatist model, the United Kingdom (UK) for the liberal model, and Spain for the polarized pluralist model. The initial plan to include an emerging economy in the sample had to be discarded due to insufficient data quality and missing data in the time series.

4.1 Measures

The sample period is from the first quarter in 2000 until the fourth quarter in 2010. GDP data and data on the evolution of consumer prices and disposable household income were taken from the OECD (2011) database for all analyzed countries, while data on the consumer confidence were taken from the consumer studies commissioned by the Directorate-General for Economic and Financial Affairs (DG ECFIN) of the European Commission (2011). The ticket price could be obtained on

[2] Supply in this context refers solely to distribution decisions whether to rush a movie to market, withhold another one, or pick up movies of a certain genre from independent producers. The planning horizon for feature films is far too long to accurately address the possible state of the economy when the movie is released after 2–4 years. The state of the economy might just as well influence the mindset of screenwriters and producers; however, these potential effects are superposed during the production cycle.

Table 1 Overview of the variables and their sources

	Variable	Level	Source
"Explanatory" variables	Gross domestic product	Per country: DE/UK/ES	OECD
	Consumer prices (indexed)		
	Disposable household income		
	Consumer confidence (indexed)		DG ECFIN
	Cinema ticket price	DE only	Federal Film Board
	Movie quality (as assessed by the audience)	Global score: overall/per genre	IMDb
"Result" variables	Movie supply (in published titles)	Per country: overall/per genre	Rentrak
	Movie demand (Box office)		

a quarterly basis only for the German market using data provided by the FFA (German Federal Film Board). The measure for movie quality was derived from the Internet Movie Database (IMDb). We did not follow the example of (Ginsburgh and Weyers 1999) who relied on awards and movie guides for expert judgments, since most movies never get mentioned or awarded. Rather than taking box office revenues as consumer judgment of quality, we referred to the user rating where IMDb users can rate a film using a scale from 1 to 10. The rating and the number of votes per film where used to calculate a weighted average quality score per genre and quarter.[3] Supply data, that is, the information on how many movies in each genre were released, and box office figures differentiated along genre boundaries (demand) were drawn from Rentrak, an entertainment market research outfit. Table 1 provides an overview of the variables and their sources.

Rentrak does not use the same set of 22 non-exclusive genres IMDb does, but a reduced set of just 13 and assigns them to one main genre.[4] Thus, the Rentrak data do not allow for assessing the trend toward multi-genre movies (Altman 1999), but Rentrak offers data from a business rather than a movie buff's perspective present in IMDb. To match the different genre categories used by IMDb and Rentrak and to simplify the models, all movies were assigned to three umbrella genres with distinct and selective usage motivations (Nabi and Wirth 2008):

- Serious: A combination of the drama, documentary, history and biography, and thriller genres. The audience presumably watches this umbrella genre for reflection and intellectual stimulation (cognitive reception mode).
- Feel-good: A combination of the animation, comedies, romances, and musicals genres. The audience presumably watches this umbrella genre for distraction and for cheering up (affective/emotional reception mode).

[3] This quality score is somewhat problematic, since all user votes ever entered on IMDb are included. IMDb does not allow to create scores using only votes from one country or a certain time span. We can expect that this kind of overall measurement reduces actual differences.

[4] Only in some cases, there is a secondary genre indicated.

- Kinetic: A combination of genres that focus on kinetic action and visual attractiveness such as action, adventure, sci-fi, horror, and fantasy. The audience presumably watches this umbrella genre also for distraction, but in a more physical and exciting way (conative reception mode).

4.2 Method

In time series analysis, changes in the data series can be distinguished among trend, cycle, seasonal, and remaining components (Lütkepohl 2004; Schlittgen 2001). The trend component describes a long-term development of the series that is not modeled but caused by an external factor. A cyclical component describes variations in the trend component in the medium term, while the seasonal component captures short-term differences related to the different levels of economic activity during a year. The remaining component is composed of random fluctuations, outliers or structural breaks, and, most importantly, the proposed effect between two times series.

Trend components can be eliminated by using a differentiated series rather than the original series, and seasonal components can be included in the model as exogenous regressors. By this means, spurious correlations can be avoided and the premise of mean stationarity can be addressed (Brockwell and Davis 2006). Regressing integrated time series leads to overestimated regression coefficients. To exclude stochastic trends, a common strategy is to use growth rates. Unfortunately, this also means lost information and one less observation (first-order differentiation).

In the following, we will present how the data were prepared for the analysis. We could use the original time series of the share of feel-good, kinetic, and serious movies both in supply and demand for all sampled countries since the data can be considered stationary (see Figs. 2, 3, 4, 5, 6, 7). Augmented Dickey Fuller (ADF) tests detected no unit root and thus showed no need to use differentiated series. The quality measure also showed no trend component. However, the time series of the economic indicators GDP, CCI, CPI, disposable household income and ticket price clearly show a trend and are integrated in first order (see Fig. 1). ADF tests suggested using growth rates (first differentiation) instead of the original time series. Furthermore, a Chow test revealed a structural break in 2008 Q1 in the GDP series for Spain. While the economic crisis starting in 2008 did not interrupt the long-term trend of the GDP in the other two countries, it did in Spain. Thus, we introduced a crisis dummy variable in the dataset for Spain. As the shares of each genre are collinear, we will only run bivariate VAR models that estimate the interaction between the economic indicators and genres one at a time.

5 Results

We will first present the results for the German market as reference case. To avoid redundancy, results for the other three markets will only be presented in terms of difference from the reference case.

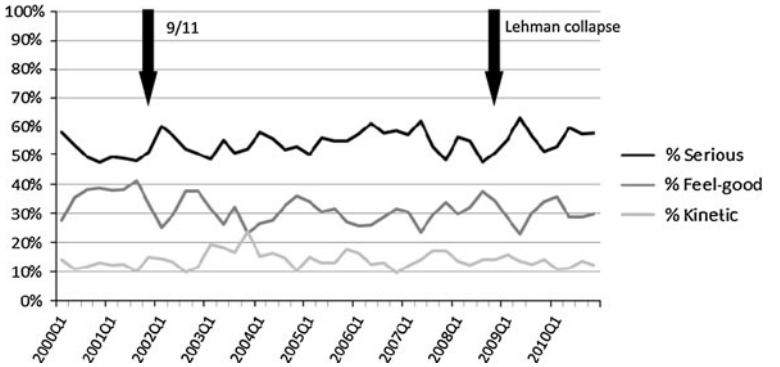

Fig. 2 Supply structure in Germany and historic events

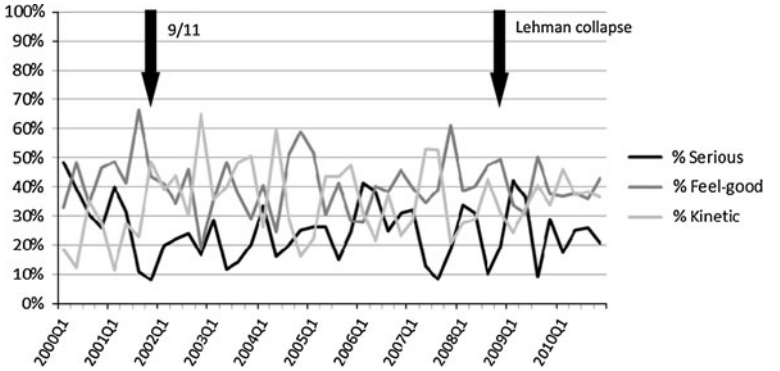

Fig. 3 Demand structure in Germany and historic events

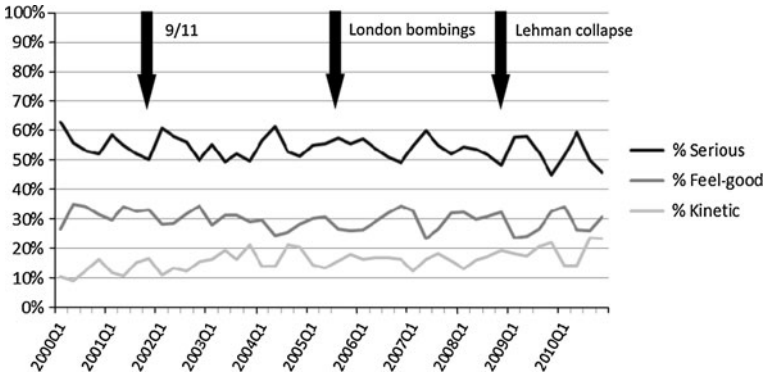

Fig. 4 Supply structure in the UK and historic events

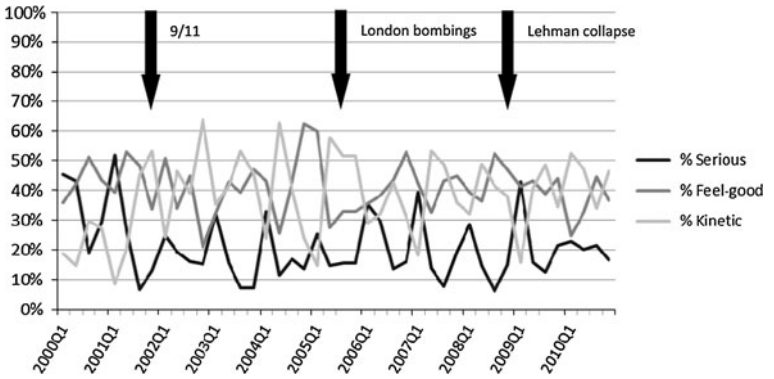

Fig. 5 Demand structure in the UK and historic events

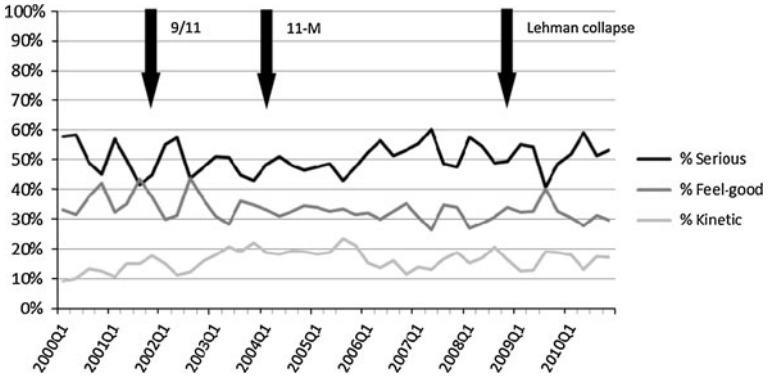

Fig. 6 Supply structure in Spain and historic events

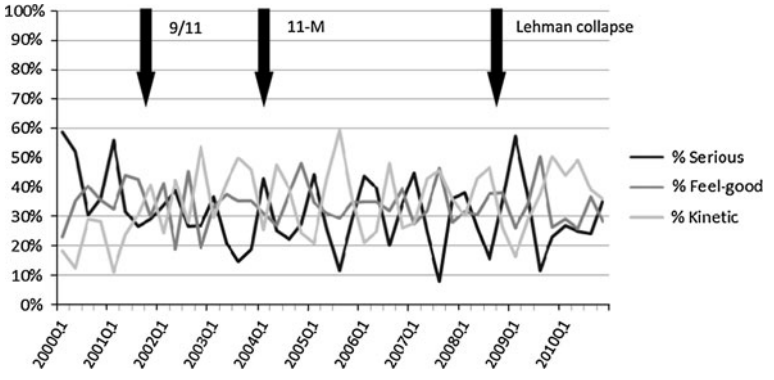

Fig. 7 Demand structure in Spain and historic events

5.1 Germany

5.1.1 Economy ⇔ Supply

We find no effect of the economy on the genre mix of the supply of movies. We modeled multiple VAR models to capture a potential relation among GDP, CCI, and CPI on the one hand and the share of the three umbrella genres serious, feel-good, and kinetic in the overall supply on the other hand. No Granger causality could be found in either case. The genre mix cannot be better explained using economic indicators and vice versa. The state of the economy and the genre mix of the total supply seem to be unrelated; however, using the overall genre mix might obstruct possible reactions of a subset of movie distributors more wary of the economy.

There seems to be a connection between the GDP and the overall supply measured in the number of films released, however. Table 2 provides the results of the VAR model estimation. The number of films released is influenced by the number of films released in the preceding quarter (lag 1) and three quarters before (lag 3). The coefficients are positive, indicating a positive feedback. Moreover, the number of films released in the preceding quarter (lag 1) also has a small but significant influence on the GDP growth rate. The higher the number of films released, the higher the GDP growth rate will be in the following quarter.

On the 10 % significance level, the number of films released Granger causes a GDP growth rate. That is, there is a lead lag between the two variables (Granger 1969). The Granger method tests whether the number of films released (supply_sum) helps to predict GDP growth rate (GDP_gr) or vice versa by the use of previous lags of supply_sum and GDP_gr. If GDP_gr can be better predicted using the histories of both GDP_gr and supply_sum than using the history of GDP_gr alone, supply_sum Granger causes GDP_gr—or supply_sum improves the prediction of GDP_gr—and vice versa. The results are displayed in Table 2.

If we only include films that are released for the first time during the quarter in question, the Granger causality between supply_sum and GDP_gr becomes even more pronounced and more significant ($F = 3.36$, $p = 0.03$).

Clearly in this case, we cannot assume Granger causality to be equal to real causality but an indication of a spurious relation to a third variable. Nevertheless, the number of films released can be interpreted as weak early indicator of changes in the GDP. Movie distributors adjust the volume of their output prior to the actual change in the economy (Table 3).

5.1.2 Economy ⇔ Demand

We find no significant connection between the economic indicators GDP, CCI, CPI, ticket price and the genre mix measured as shares of the umbrella genres or the overall demand. No Granger causality can be found in either instance.

Consistent with the studies referred to in the literature review, we find an influence of the disposable household income on the overall demand, whereby the income Granger causes the demand. However, the effect has a long delay: Four

Table 2 VAR model of GDP growth rate (GDP_gr) and total movies released (supply_sum)

Equation	Parms	RMSE	R^2	p
GDP_gr	10	0.849	0.348	0.115
supply_sum	10	12.089	0.803	0.000
	Coef.	Std. Err.	t	p
GDP growth rates (dependent variable GDP_gr)				
GDP_gr				
L1	0.416	0.177	2.35	0.026
L2	0.009	0.191	0.05	0.962
L3	0.150	0.171	0.88	0.388
supply_sum				
L1	**0.030**	0.012	2.48	**0.019**
L2	−0.011	0.016	−0.68	0.501
L3	−0.018	0.013	−1.39	0.176
Total movies released (dependent variable supply_sum)				
GDP_gr				
L1	−1.695	−2.521	0.67	0.507
L2	0.0126	2.719	0.00	0.996
L3	−0.7793	2.441	−0.32	0.752
supply_sum				
L1	**0.660**	0.174	3.80	**0.001**
L2	−0.191	0.226	−0.85	0.403
L3	**0.486**	0.183	2.65	**0.013**

Significant values are in bold

Sample: 2001 quarter 1–2010 quarter 4, $n = 40$ observations

For brevity reasons, we do not report the coefficients for the seasonal dummies and the constant

Table 3 Granger causality test of GDP growth rate and number of films released in Germany

Causal direction	F	p
supply_sum → GDP_gr	2.39	0.09
GDP_gr → supply_sum	0.25	0.86

Sample: 2001 quarter 1–2010 quarter 4, $n = 40$ observations. 3 lags

quarters after the household income raises the total box office declines (Table 4). Thus, going to the cinema is indeed a low-cost leisure activity that is replaced by more expensive activities when the disposable income rises.

However, the change in disposable household income does not affect respective revenue share of the three umbrella genres. Thus, the genre mix cannot be better explained using economic indicators and vice versa.

Table 4 VAR model of disposable household income growth rate (GDP_gr) and total movie revenue (demand_sum)

Equation	Parms	RMSE	R^2	p
hh_income_gr	6	0.727	0.184	0.205
demand_sum	6	0.000	0.564	0.000
	Coef.	Std. Err.	t	p
Disposable household income growth rates (dependent variable hh_income_gr)				
hh_income_gr				
L4	−0.293	0.157	−1.86	0.071
demand_sum				
L4	0.007	0.004	1.69	0.100
Total box office revenue (dependent variable demand_sum)				
hh_income_gr				
L4	**−20.965**	5.901	−3.55	**0.001**
demand_sum				
L4	−0.030	0.154	0.20	0.844

Significant values are in bold

Sample: 2001 quarter 1–2010 quarter 4, $n = 40$ observations

For brevity reasons, we do not report the coefficients for the seasonal dummies and the constant. Wald lag exclusion tests showed that lag 1–3 can be excluded from the model

5.1.3 Demand ⇔ Supply

Distributors in Germany do not refer to the state of the economy when deciding what genres to publish but apparently use other criteria to decide. Since we find little evidence for economic influence on supply and demand in cinema entertainment, we should take a step back and analyze the relationship between demand and supply. If the industry in general had profit maximization as its goal—which is contested by some researchers—changes in the genre mix on the demand side should lead to accordant adjustments in the genre mix on the supply side in following quarters. The comparison of supply and demand figures reveals a strong disparity between the two. Film enthusiasts might regard this as proof of their understanding of film as art, while more market-oriented types might call this neglecting consumer interest. Between 2000 Q1 and 2009 Q4, 46.2 % (SD = 0.045) of all films released in Germany were of a serious genre (drama, documentary, thriller). In the same period, these genres captured only 24.9 % (SD = 0.105) of the box office. Thus, serious genres were heavily oversupplied by 21.8 percentage points. The standard deviations show that supply is relatively invariant, while demand is fluctuating more. Conversely, feel-good movies (comedy, romance, etc.) captured 40.7 % (SD = 0.099) of the audience market with only 31.9 % (SD = 0.040) of the supply, and kinetic movies (action, adventure, horror, etc.) fared relatively better, with a 34.3 % (SD = 0.127) revenue share out of the 21.7 % (SD = 0.022) supply share. Out of 40 quarters, the movies

with serious genres had the biggest share in supply for 37 quarters and the lowest share in the audience demand for 25 quarters. To put it in statistical terms, the Pearson correlation between supply and demand ranges from $r = 0.15$ for serious genres to $r = 0.39$ for feel-good genres and is significant ($p < 0.05$) only for the latter.

If we estimate VAR models to detect lagged effects, it turns out that in all three markets the share of serious films in demand has no lagged effect on the share in supply. The supply share is determined only by the lagged supply share. The supply share of feel-good movies is Granger caused by the demand share ($F = 2.30$, $p = 0.07$). A higher share of feel-good movies on the demand side leads to a higher share of feel-good movies on the supply side. The effect occurs on a short term within one or two quarters. For kinetic movies, supply and demand Granger cause each other indicating a reciprocal relation.

When analyzing the quarterly revenue data for cinemas, we find that variations in demand in all three analyzed markets correlate with the release dates of extraordinarily successful movies. Thus, a potential effect of the state of the economy might be superposed by fluctuations in the quality of the released movies. The movie industry might not constantly be able to offer a slate of movies capable of capturing the complete potential audience interest. However, on the level of umbrella genres, we find no connection between the quality of the supply and the demand, neither direct nor lagged and in none of the sampled countries. Aggregation in umbrella genres seems to hide the effects of individual movies. Summing up, we can conclude that the movie market needs to be divided into different submarkets. While distributors in the feel-good market seem to be demand oriented, those in the serious market seem to be fairly deaf toward the market demand and subsequently are unlikely to address changes in audience demand. To be fair, we should add that distributers can only release what producers offer, and producers are more likely to churn out dramas because they are less expensive than special-effects-laden action movies or summer comedies with all-star casts. People who produce movies to create art usually produce dramas rather than comedies. Our results of the oversupply of serious movies are also in line with the findings of Ravid and Basuroy (2004) who explain an oversupply in violent films with a managerial focus on revenue maximization and excessive hedging.

5.1.4 Historic events

If the economic and quality indicators cannot sufficiently explain the shifts in the genre structure of movie supply and demand, and demand only partly instructs supply, other influencing factors might be more powerful explicators. We follow the approach of Gowgiel and McIntosh (2010) who suggest that different types of threats might have different effects on TV viewing habits. They use the attacks on the World Trade Center as an example of a physical threat and the collapse of the Lehman Brothers bank as example of an economic threat. While the former would lead to a higher demand for serious content, the latter would have no effect on viewing habits. Overall demand in our sample is fluctuating too much to render an impact-response-analysis a viable analytic strategy. Thus, in the following we will provide a visual inspection of the data and focus on changes in the genre shares in

Table 5 Granger causality test of GDP growth rate and number of films released in the UK

Causal direction	*F*	*p*
supply_sum → GDP_gr	1.44	0.25
GDP_gr → supply_sum	3.10	0.04

Sample: 2001 quarter 1–2010 quarter 4, $n = 40$ observations. 3 lags

the aftermath of the same events analyzed by Gowgiel and McIntosh. Both events happened in the United States, but they had a global impact, so we can also expect them to be relevant in European markets.

In Germany, we can see a pronounced reaction of the distributors in the aftermath of historic events (see Fig. 2). After the terror attacks on the World Trade Center and likewise after the collapse of Lehman Brothers, the share of serious films rose, predominantly due to an increasing number of documentaries released. At the same time, the share of feel-good movies dropped. It seems as if distributors assumed a need for explanation among a sober audience. However, the audience reaction uniformly responded to this change in the mix of film genres offered (see Fig. 3). After 9/11, the demand for kinetic movies expanded, while the share of kinetic movies on offer had hardly changed. Contrarily, after the Lehman Brothers collapse marking the beginning of the financial crisis, indeed the audience showed a greater interest in the rising number of serious films, while the demand for feel-good movies dropped.

We can conclude that on the supply side, the distributors show a more pronounced reaction on external event than the audience on the demand side. This supports the view of distributors not only reacting on the demand but acting based on a sense of a mission.

5.2 United Kingdom

5.2.1 Economy ⇔ Supply

Just like in the German market, we find no significant relation between CCI or CPI and the genre share or the number of films released in the UK market.

Contrary to our findings on the German market, in the UK, the estimation of a VAR model linking the number of films released with the GDP growth rate indicated an influence of GDP on supply. The first lag of GDP_gr has a significant positive effect on supply_sum. A test for Granger causality reveals the opposite causality direction than on the German market: GDP leads supply (Table 5).

We cannot replicate the results found in Germany, and thus there is no universal pattern of how distributors react on changes in the GDP growth rate. While distributors seem to anticipate changes in Germany, in the UK they only react when change has already happened (Tables 6, 7).

Moreover, for the UK, we find a significant ($p = 0.06$) effect of the GDP growth rate on the share of feel-good movies. A higher GDP growth rate leads to a (marginally) higher share of feel-good movies in the following quarter (coefficient = 0.009). Conversely, when the economy shrinks, the audience turns away

Table 6 VAR model of GDP log (GDP_l) and share of feel-good movies released (feelgood_ss)

Equation	Parms	RMSE	R^2	p
GDP_l	9	0.003	0.999	0.000
feelgood_ss	9	0.025	0.680	0.000
	Coef.	Std. Err.	t	p
GDP log (dependent variable GDP_l)				
GDP_l				
L1	1.757	0.061	28.70	0.000
L2	−0.760	0.059	−12.83	0.000
supply_sum				
L1	0.007	0.016	0.45	0.655
L2	−0.001	0.016	-0.06	0.949
Share of feel-good movies released (dependent variable feelgood_ss)				
GDP_l				
L1	**−1.558**	0.611	−2.55	**0.016**
L2	**1.394**	0.591	2.36	**0.024**
feelgood_ss				
L1	0.085	0.162	0.53	0.600
L2	−0.373	0.164	−2.28	0.029

Significant values are in bold

Sample: 2000 quarter 3–2010 quarter 4, n = 42 observations

For brevity reasons, we do not report the coefficients of the exogenous variables: seasonal dummies, constant, and crisis dummy

Table 7 Granger causality test of GDP log and the share of feel-good movies in the overall number of films released in Spain

Causal direction	F	p
feelgood_ss → GDP_l	0.10	0.90
GDP_l → feelgood_ss	10.32	0.00

Sample: 2000 quarter 3–2010 quarter 4, $n = 42$ observations. 2 lags

from feel-good movies. However, the explanatory power of this VAR model is rather weak ($R^2 = 0.34$), and thus we cannot interpret this result as support for the ESH.

5.2.2 Economy ⇔ Demand

As for the German market, we found no significant relation between any of the economic indicators and any of the demand figures. Just like in Germany, movie demand in the UK seems to be driven by other factors.

5.2.3 Demand ⇔ Supply

While the actual values in the correlations between demand and supply differ slightly from the German market, the pattern remains the same in the UK. Clearly, there are more serious movies offered than there is demand for them. Again, we find no Granger cause relation between demand and supply of serious movies; and again, we find that the demand for feel-good movies Granger causes the respective supply. In the UK, kinetic demand Granger causes kinetic supply. Just like in Germany, fluctuation in the quality of the movies supplied does not influence the aggregated demand. Thus in the UK, we have the strongest support for the hypotheses of distributors reacting on the audience demand.

5.2.4 Historic events

A comparison with the other sampled countries reveals that we cannot assume a general pattern in which economic threats drive both supply and demand of serious fare while existential threats lead to more serious supply as the audience longs for distraction. In the UK, distributors' reactions to both 9/11 and the Lehman Brothers collapse are much less evident.

After 9/11, the demand for kinetic movies slightly rose with a steep dip in the next quarter. After the attacks on the public transport in London (2005 Q3), demand for kinetic movies is substituted with serious movies. After the Lehman Brothers collapse, the demand for serious movies rose in Britain only in the second quarter, which seems to be a seasonal pattern. In the UK, serious movies regularly draw a larger audience share in the first quarter of each year.

5.3 Spain

5.3.1 Economy ⇔ Supply

In the Spanish market, we find no significant relation between economic indicators CCI and CPI and the genre shares or the number of films released. To obtain a stationary time series for the Spanish GDP data, we used the log of GDP rather than the growth rate and introduced additional crisis dummy to capture the structural break caused by the economic crisis starting in 2008 Q1. GDP has no significant effect on the share of serious or kinetic films, but as in the UK, we find an effect of GDP on the share of feel-good movies. GDP Granger causes the share of feel-good movies, though with puzzling effects. A growing GDP leads to a decrease in feel-good movies in the next quarter, but an increase in the quarter following.

5.3.2 Economy ⇔ Demand

Again, we find no significant relation between economic indicators and demand. Thus, for none of the sampled countries is there an immediate or a lagged effect of GDP or CCI.

5.3.3 Demand ⇔ Supply

Again, just like in the German market, we find a clear oversupply of serious movies and a weak correlation between supply and demand. A VAR model shows no lagged effect of demand on supply for serious and feel-good movies. However, for kinetic movies, the demand seems to breed demand since kinetic supply Granger causes kinetic demand. Again, we find no influence of quality fluctuations on the demand.

5.3.4 Historic events

In Spain, we see the same distributor reaction to 9/11 as in Germany; however, no reaction to the collapse of Lehman Brothers. There is virtually no demand-side reaction on the attacks of the World Trade Center, and the development of the demand after the attacks on commuter trains in Madrid known as 11-M (2004 Q1) does not seem to be especially different. The aftermath of the Lehman Brothers collapse is characterized by the same rise in demand for serious movies as in Germany.

6 Discussion

Our analysis of possible interactions between economic indicators and the genres sought by the audience provides support neither for the ESH nor for the competing distraction hypothesis. The demand for cinema entertainment as a whole is unrelated to economic indicators such as GDP, consumer confidence, and consumer prices. Only the disposable household income has some effect on the overall demand. In all three countries analyzed, a cinema visit can be considered as a low-cost leisure activity. We could possibly find different results for markets in which a cinema visit is more expensive relative to purchasing power. However, we find no connection between income and genre choice. We have contradictory results concerning the interaction between economy and movie supply. The results might be improved if we could add information about the average production budget to the number of films released. The number of films released is less likely to change with the GDP than the budget since the number of screens and the release slots remain on the same level while the production funds might dry up during a recession. However, it is evident from our results that many distributors are not predominantly in the market for profit maximization since they constantly release more serious movies than are in demand.

Distributors seem to be willing to adjust their movie portfolios to economic and societal changes, but they do not seem to be especially good at anticipating shifts in audience interest.

Chances are that possible influences of the economy have different relevance for different submarkets of the movie business. We can assume that distributors in the art-house sector have a stronger sense of the mission and are only to a lesser extent guided by profit maximization. On the contrary, blockbuster distributors should be less sensitive concerning external effects besides economic key figures. To further

confirm our result, it would be interesting to re-run the analysis with separate time series for art-house and blockbuster distributors or include figures on the number of screens per movie—data that were not available to us.

One might also expect that there are different patterns at work for domestic and foreign movies possibly with a more uniform supply and demand for international movies, while local fare could be subject to stronger fluctuations. To test for this, we doubled our analysis differentiating between domestic and foreign movies. Although some (serious) genres are known to cross borders better than others (e.g., comedies), we could not find any significant differences between the two groups. Two explanations can be extended: Differences between the genres might be exaggerated in the literature. If a comedy movie like Barbershop (Story 2002) with an African-American cast and theme fails to attract a European audience, other comedies like Bruce Almighty (Shadyac 2003) are well received. Thus, on an aggregate level, this issue might be less relevant. The other explanation could lie in the difficulty to assign a "nationality" to a movie. Co-productions collect funding in several markets and are regarded as domestic in each of them. Thus again, differences are diminishing on an aggregate level.

The fundamental uncertainty in the movie industry where "nobody knows" (Caves 2003) about the quality perception of the audience and its willingness to pay for a experience good superposes potential influences. The fluctuation in the quality of the movies released in any given time period is higher than the fluctuation of consumer demand induced by economic growth or recession. As long as the output quality varies that much, we cannot entirely rule out an effect of the state of the economy on demand, but we cannot measure it properly either. Furthermore, reducing a film to its umbrella genre might be a too drastic reduction in the complexity of the product. Genre is but one element of a movie that can be understood as an "inseparable commodity" (Albert 1999). Thus, it would be interesting to find out how other elements (e.g., archetypes, plot lines, but also stars, special effects and budget) relate to the state of the economy and what kind of interaction effects exist between the elements. Unfortunately, such an approach is by and large limited to case studies of certain films, since it is not possible to obtain complete and comparable data for the whole output of the industry.

In terms of the influence of historic events, we cannot support the findings of Gowgiel and McIntosh (2010) in the TV context where existential threats would lead to a higher demand for serious fare, while financial threats would not. The results are inconsistent between the sampled countries. However, by trend, the results suggest the reverse relation. The distributors' reaction to historic events seems to be influenced by country characteristics. While in Germany we see a clear trend toward serious movies, this is less evident in the UK and Spain. If we disaggregate the genres and expand the analyzed period, more distributor reactions to the historic events become evident. In Germany, for instance, in the aftermath of the Gulf War of 1990–1991, there were considerably more action movies. The distributors might have thought "We must offer at least as much action in the cinema as on CNN." At the end of sixteen years of conservative government under Chancellor Kohl, the supply of comedies dried up, and tightened labor market legislation (Hartz IV) was accompanied by a much enlarged share of romance

movies. The reasoning might have been "Times are getting tough for our audience; we should give them a private perspective." The lagged reaction on the terror attacks of 9/11 was a larger number of comedies possibly in an effort to cheer everyone up. The answer to the collapse of Lehman Brothers at the height of the recent financial crisis was a larger offering of documentaries. All of these fluctuations result from the programming decisions of distributors who decide to postpone movies they might regard as inappropriate and release movies they might not have released at all in different times. Apparently after 9/11, distributors believed that there is a need for distraction, while in the financial crisis they thought the audience would long for an explanation. The audience does not always react as predicted by the distributors, however. In the third and fourth quarters of 2001, comedies were popular, but fantasy movies were even more so. In this case, the popularity of individual movies might distort the overall picture. The first part of the hugely successful *Lord of the Rings* trilogy was released in late 2001. In 2008, the audience did not respond to the increased number of documentaries, and the market share of documentaries at the box office remained at around 1 %. We can conclude that, just as economic key data, historic events are not sufficient to explain shifts in the genre mix on the demand or supply sides of the movie market. Success it seems remains an attribute that is best described in retrospect and on an individual basis.

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